

Probing Meson Structure via Lattice QCD: EMFF at high Q^2 and GPD

We present lattice QCD computations addressing crucial aspects of meson internal structure through electromagnetic form factors (EMFFs) and generalized parton distributions (GPDs). Utilizing physical masses and fine lattices, we calculate pion and kaon EMFFs at momentum transfers up to approximately 10 and 28 GeV^2 , respectively, achieving good agreement with available experimental data at low momentum transfers and providing essential ab-initio benchmarks for upcoming high-energy experiments. Additionally, we compute the x-dependent valence pion GPDs at zero skewness across various momentum transfers by employing advanced renormalization and matching schemes, and also deliver a three-dimensional image of the pion structure in impact-parameter space.

The talk is based on

[1] H.T.Ding, X.Gao, A.D.Hanlon et al., Phys.Rev.Lett. 133 (2024) 18, 181902

[2] H.T.Ding, X.Gao, S.Mukherjee et al., JHEP 02(2025)056

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